

25X1

SIXTH MONTHLY NARRATIVE REPORT

15 January 1966

25X1

REFERENCE

25X1

Job No. 645

REPORTING INTERVAL

10 December - 10 January 1966

OBJECTIVE

The objectives of this program are to define the operational objectives for automatic screening of photographic intelligence data; to study, test and evaluate the techniques applicable to the problem; and to generate a design for an operational prototype system. Extensive experimentation on existing scanning and processing equipment, coupled with computer simulations of recognition systems, will be used to test the feasibility of several schemes. The final system design will be based upon the results of the techniques study and the operational objectives defined in the program.

STATUS OF ACTIVITIES AND ACCOMPLISHMENTS

During the reporting period, work continued on the evaluation of the Integral Scanner and frequency-domain analysis as was suggested at the 3 December 1965 review meeting.

Declassification Review by NGA/DoD

This evaluation is based on a series of experiments. For each experiment, frequency analysis is performed on the video signal generated by scanning 2" x 2" super slides of selected imagery of gray-scale targets. The frequency information is used to establish 400 quantified D-cell values which are punched into 5-level paper tape. The format of this tape is processed on the G-15 to make it compatible with the SDS 925, which is designed for 8-level tape. The 925 is trained to act as a decision logic for the test stimulus. Thus, a complete experiment requires that the scanner, processor, SDS 925, and G-15 all be operating and available. If unexplained variations in performance occur, the high-contrast primitive shapes are used to assist in the diagnosis.

During this period, we have chosen to continue the experiments with the frequency-domain processing equipment rather than stopping the experiments in order to modify the time-domain analysis equipment. During the period, 500 samples have been completely processed and 500 are being processed. The experiments include: the testing of single targets in various rotations and translations; the simulation of a screening operation that separates images of man-made objects from images of all other objects on large-scale and medium-scale photography supplied by SEQ and RADC (USAF); and the simulation of a screening operation (on photography supplied by Ft. Monmouth, N.J.) that separates very high-contrast, very large-scale imagery of tanks from background imagery. (Because some of the experiments are not complete, any discussion of error rates would not be meaningful).

The equipment, computer programs, and procedures have been developed so that it is possible to run an experiment of approximately 100

samples in one to two days. The stimulus materials must be 1 5/8" x 1 5/8" frames in 2" x 2" super slide-mounts, and the computers must be available for conversion of the tapes and processing of the data. Now that all of the equipment is functioning and the operators trained, experiments should be run until our imagery is exhausted. However, because it is necessary that we write our final report during March, the experiments will be stopped unless some way is found to fund the continued use of this capability. Imagery can be found if funds exist to maintain the effort. An extension would permit direct comparison between the time- and frequency-domain analysis.

The hiatus still exists for the system and equipment design work and current plans do not call for a resumption of this phase of the problem. The final report will include a discussion of this work.

DIFFICULTIES ENCOUNTERED

The lack of exemplary imagery of militarily significant targets limits the tests to cultural targets. We need film spools for 5-inch and 9-inch roll film.

PROGRAM FOR NEXT INTERVAL

During the next reporting period, emphasis will be placed on experimentation with the integral scanner and the frequency domain analysis, and the continuing search for imagery. The time-domain analysis equipment will be modified for punch output, and the 400 D-cell ADALINE adaptive program will be changed from a two-class to a four-class capability.

We expect to receive more tactical imagery and will process as much of it as possible.

Work will continue on the establishment of suitable diagnostic tests and methods of presenting the results of pattern-recognition experiments.

25X1